

# SCIENCE

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## THE CHEROKEES IN PRE-COLUMBIAN TIMES.

### I.

THE present paper is an attempt by the writer to trace back the history of a single Indian tribe into the prehistoric or mound-building age. For this purpose the Cherokees have been selected, partly because of their isolated position geographically and linguistically, and partly because the data bearing upon the questions that arise in such an investigation are probably more complete than those relating to any other tribe of the mound section.

Although the scope is thus limited, there are certain facts relating to the mound region and the aboriginal inhabitants thereof, considered generally, which must be taken into account in studying the history of any tribe of this region.

The history of the Western Continent is supposed to begin with the discovery by Columbus, all that antedates that event being considered archæologic or prehistoric. While this is correct in the general sense in which it is used, yet the history of the different sections and different tribes begins with the first knowledge of them obtained by Europeans. The border-line, therefore, between the historic and prehistoric eras, varies in date when referred to the different sections and peoples. For example, history tells us nothing of what was transpiring in the area now called Ohio for a hundred years after Cortez landed in Mexico. If it be possible to ascertain this, it must be sought in the traditions of the aborigines, the ancient monuments, and other prehistoric data of that area.

It is well known that when the various sections of this country were first visited by Europeans, they were found occupied by Indian tribes; while, on the other hand, there is no historical or other evidence, unless it be found in the monuments, that any other race or people than the Indians ever occupied this region. The possibility of an Irish, Welsh, or Northmen pre-Columbian settlement is not at the present time taken into consideration, as it has no bearing on the subject now under discussion. These tribes all belonged relatively to the same state of culture, which was of a grade inferior to that of the more advanced nations of Mexico and Central America.

Though not recorded in written or printed tomes, these aboriginal tribes must have had a history which still lived to some extent in their traditions, languages, customs, arts, beliefs, and relics, when the whites first became acquainted with them. These languages, customs, etc., though belonging to a plane much lower than that which ethnologists will allow us to call civilized, were not the growth of a season or a lifetime, but of centuries. If they exhibit tribal or ethnic

peculiarities, it may be taken for granted that these peculiarities attained their growth subsequent to the separation of the stock into the tribes among which they are found. If they are local or confined to certain geographical areas, it is reasonable to assume that they were adopted by the tribes after reaching these localities. For example: the peculiarities of the civilization of Mexico and Central America, as seen at the time of the discovery of these countries, must be considered indigenous, so long as we are unable to trace them to other sections or other peoples,—a conclusion adopted by leading historians and antiquarians. The same thing is true to a more limited extent in regard to the subdivisions of these comprehensive groups, and affords some basis for estimating the period of occupation.

Those habits, customs, or arts common among savage peoples, of course teach nothing in regard to the occupants of any special locality, except to indicate the culture status. It is therefore to those which are local or ethnic that we must look for guidance in our search.

A second fact relating to the mound region generally is, that the ancient remains found in it, though presenting various types and numerous important differences, probably the result of different local or tribal customs, are evidently the work of peoples in about the same stage of culture. But to this and other general lessons taught by the monuments there will be occasion to call attention further on.

In order to clearly understand the position of the Cherokees' relation to the other tribes in the mound area, we refer briefly to the linguistic distribution of these tribes when they first became known to the whites.

Stretching along the Atlantic coast from the mouth of the St. Lawrence to Pamlico Sound, and extending westward to the Mississippi, was the great Algonquin family, with its numerous divisions and branches. In the midst of this great linguistic sea, occupying most of what is now New York, and extending westward on both sides of the Lakes to Michigan (with a closely allied and also a distant offshoot—the latter the Cherokees—in the region of Carolina), was the Huron-Iroquois family, with its various branches. About the head waters of the Mississippi, and reaching westward far out upon the plains and southward to the Arkansas River, was the Dakotan family. Spread over the Gulf States was the Muskokee group. Add to these the vestiges of other stocks found driven, so to speak, into the corners here and there, and we have a condition that could not have been of mushroom growth, but the outcome of centuries. It is quite probable that the family stems migrated from other sections; but the splitting into branches and dialects took place, in part at least, after reaching the area in which these

stocks were found. One proof of this is seen in the grouping and geographical distribution of the comprehensive families over the continent.

Judging by the growth of languages in Europe, although the cases are not exactly parallel, centuries must be allowed for this local development. It is said by those best qualified to judge, that the shifting, changing, and tribal development known to have taken place among the Dakotas of the North-west alone must have required three or four centuries in advance of the Columbian discovery. The necessary inference to be drawn from this is, that the tribes, or rather families of tribes, found inhabiting this "mound region" by the first European explorers, had occupied substantially the same area for hundreds of years previous thereto. Not that there was no shifting or changing of positions by tribes, for there can be no doubt that this occurred to a greater or less extent, but that the families or stocks mentioned, or most of them, were in the area included in the eastern half of the United States and Canada (which we designate in a broad sense the "mound region") for centuries preceding the advent of the white man.

The same method of reasoning will apply to some extent to the growth of customs, as this must also have required time. The result of this course of reasoning, which seems to be justified by the facts, is to force us to one of the following conclusions: 1st, That the mound-builders, if a different race or people from the Indians, disappeared from the mound area many centuries before the advent of the whites; or, 2d, That there was an overlapping of the two races, that is to say, they occupied the area jointly for some centuries; or, 3d, That the Indians were the authors of the ancient monuments. As it will be necessary in the course of this investigation to discuss the question of the authorship of some of these antiquities, the decision reached on this subject is important in this connection.

Turning now to the Cherokees, we will proceed with the special object of this paper.

It is conceded that there is no hope of reconstructing a systematic pre-Columbian history of any one of the tribes or peoples of the area under consideration. The utmost that can be expected is, by a careful and thorough correlation of the data, to throw some light into that past which has so long been considered as wrapped in impenetrable mystery. It is by no means probable that as much will be accomplished in regard to the past of the people of this region as has been done for Mexico and Central America, yet it is the belief of the writer that much more is possible in this direction than has generally been supposed.

This tribe was for a long time a puzzling factor to students of ethnology, as they were in doubt whether to consider it an abnormal offshoot from one of the well-known Indian stocks or the remnant of some undetermined or extinct family. It now appears, however, to be the clearly settled opinion of linguists that the language is an offshoot of the Huron-Iroquois stock. This is an important fact in the study of the past, not only of this tribe, but also of the family with which it is connected, as it necessitates looking to the same point for the origin of both.

When the people of this tribe first became known to the Europeans, they were located in the mountainous region including the south-east corner of what is now Tennessee, the

south-west portion of North Carolina, the north-west part of South Carolina, and a strip along the northern border of Georgia,—a section which they continued to occupy down to a recent date, and where a remnant may still be found.

The first notice of them is found in the chronicles of De Soto's expedition, which speak of them as the "Chelaques" or "Achelaques," words which give more correctly the sound of the name they gave themselves than the modern Anglicized form "Cherokee." These early records locate them about the head waters of the Savannah River. The exact route of the Spanish expedition has not been satisfactorily determined; nevertheless it is conceded by those best qualified to decide, that, when De Soto encountered people of this tribe, he was somewhere about the head waters of the Savannah, probably in the north-eastern part of Georgia. It was in this section, presumably in western North Carolina, that John Lederer encountered them during his visit to this part of the continent in 1669-70, for there can be no longer any reasonable doubt that he alludes to them where he speaks of the Indians of the "Apalatian Mountains." Their subsequent history is too well known to require further mention here.

Their relation to the Iroquois indicates a northern rather than a southern or south-western origin. This seems to be confirmed by the few rays of light which tradition, the records, and archæology throw upon their past history. Haywood states, in his "Natural and Aboriginal History of Tennessee," that they "were firmly established on the Tennessee River or Hogohega (the Holston) before the year 1650, and had dominion over all the country on the east side of the Alleghany Mountains, which includes the head waters of the Yadkin, Catawba, Broad River, and the head waters of the Savannah,"—a statement borne out by the fact that as late as 1756, when the English built Fort Dobbs on the Yadkin, not far from Salisbury, they first obtained the privilege of doing so by treaty with Atacullaculla, the Cherokee chief. The same authority states that they formerly had temporary settlements on New River (the Upper Kanawha) and on the head waters of the Holston. In De Lisle's maps, 1700 to 1712, Cherokee villages are located on the extreme head waters of the Holston and Clinch Rivers, as well as on and about the mouth of the Little Tennessee.

Their traditions in regard to their migrations are somewhat confused, and, like all Indian traditions, must be taken only with careful sifting, and where strengthened by corroborative evidence or well-marked indications of being ancient. Yet there is a uniformity in some respects which, independent of other evidence, would justify the assumption that they contain a vein of truth and have some basis of fact.

One of the most important of these is that mentioned by John Haywood in the work above named, in which they claim to have formerly lived in the Ohio valley, and to have constructed the Grave Creek mound and other earthworks in that section. This author's statement is as follows:—

"The Cherokees had an oration in which was contained the history of their migrations, which was lengthy." This related "that they came from the upper part of the Ohio, where they erected the mounds on Grave Creek, and that they removed hither [East Tennessee] from the country where Mon-

ticello is situated." This tradition of their migrations was, it seems, preserved and handed down by their official orators, who repeated it annually in public at the national festival of the green-corn dance. Haywood adds, "It is now nearly forgotten;" and Dr. D. G. Brinton informs us, in "The Lenape and their Legends," that he has endeavored in vain to recover some fragments of it from the present residents of the Cherokee nation.

Haywood asserts, probably from original statements made to him, that "before the year 1690 the Cherokees, who were once settled upon the Appomattox River in the neighborhood of Monticello, left their former abodes, and came to the West. The Powhatans are said by their descendants to have once been a part of this nation. The probability is that a migration took place about or soon after the year 1632, when the Virginians suddenly and unexpectedly fell upon the Indians, killing all they could find, cutting up and destroying their crops, and causing great numbers to perish by famine. They came to New River and made a temporary settlement, and also on the head of the Holston."

It is obvious that in this passage the author has given his conclusion based on the "oration" mentioned, connecting with it the historical event of the sudden onslaught by the Virginia settlers upon the Indians, in 1632. That his deduction in this respect is erroneous if intended to apply to the whole tribe, is apparent from the following facts: first, because it is evident that a portion, at least, of the tribe was located in their historic seat, in and about East Tennessee and western North Carolina, when De Soto passed through the northern part of Georgia in 1540, as it is admitted that the "Chelaques" or "Achelaques" mentioned by the chroniclers of his expedition were Cherokees; second, because John Lederer, who visited this region in 1669-70, speaking of the Indians of the "Apalatian Mountains,"—doubtless the Cherokees, as he was at that time somewhere in western North Carolina,—says, in his "Discoveries," "The Indians of these parts are none of those which the English removed from Virginia, but were driven by an enemy from the north-west and invited to fix here by an oracle, as they pretend, above four hundred years ago;" third, from what is shown by the archæologic evidence which will be introduced further on.

The language of Lederer indicates that he had heard substantially the same tradition as that of which Haywood speaks. An important addition, however, is the supposed date of this migration, which this author says was "above four hundred years" preceding the date at which he writes (1671-72), which would place it in the latter part of the thirteenth century. The tradition as given by Haywood brings them from the valley of the Upper Ohio; that by Lederer, from the north-west,—a close agreement as to the direction of their former home.

It is doubtful whether any importance is to be attached to Haywood's statement that there was formerly a settlement in the vicinity of Monticello, Va. It is possible, that, during the migration toward the south-east, a party or clan broke off from the main body of the tribe, and settled in that region, where they remained until the general attack by the whites in the early part of the seventeenth century. Mr. Royce, in his paper on the "Cherokee Nation of Indians," in the "Fifth Annual Report of the Bureau of Ethnology,"

gives a tradition preserved among the Mohicans (or Stock-bridges) which he suggests may have some bearing on this question. It is that "many thousand moons ago, before the white men came over the great water, the Delawares dwelt along the banks of the river that bears their name. They had enjoyed a long era of peace and prosperity, when the Cherokees, Nanticokes, and some other nation whose name had been forgotten, envying their condition, came from the south with a great army, and made war upon them. They vanquished the Delawares, and drove them to an island in the river. The latter sent for assistance to the Mohicans, who promptly came to their relief, and the invaders were in turn defeated with great slaughter, and put to flight. They sued for peace, and it was granted on condition that they should return home and never again make war on the Delawares or their allies. These terms were agreed to, and the Cherokees and Nanticokes ever remained faithful to the conditions of the treaty."

Passing over the improbability that a marauding party forced to fly would stop and sue for peace, the tradition may, after all, have some basis of fact, as there is nothing improbable in the supposition that a band of Cherokees went north from the banks of the Holston or Kanawha as far as the Delaware on a war expedition.

What is supposed to be the earliest notice of this tribe through the settlers of Virginia is that given by the historian Burke. According to this author, Sir William Berkely, governor of that State, sent out in 1667 an expedition consisting of fourteen whites and an equal number of friendly Indians, under command of Capt. Henry Blatt, to explore the mountainous region to the west. After seven days' travel from their point of departure at Appomattox, they reached the foot of the mountains. The first ridge they crossed is described as being neither very high nor steep; but the succeeding ones, according to their statement, "seemed to touch the clouds," and were so steep that an average day's march while passing over them did not exceed three miles. After passing beyond the mountains they came into a level region, through which a stream flowed in a westward course. Following this for a few days, they reached some old fields and recently deserted Indian cabins. Beyond this point their Indian guides refused to proceed, alleging that not far away dwelt a powerful tribe that never suffered strangers who discovered their towns to return alive: consequently the party was forced to return. It is believed by some authorities that the powerful nation alluded to in the narrative of this expedition was the Cherokees.

It is probable that the point reached was what is now Floyd or Montgomery County, and that the Indians so much dreaded were located on New River or the extreme head waters of the Holston.

Another tradition related by Haywood is that one party or band of the tribe came to their mountain home from the neighborhood of Charleston, S.C., and settled south of the Little Tennessee, near what is now the Georgia line. The people of this branch called themselves "Ketawanga," and came last into the country.

Another tradition is, that when they first came into this region they found it uninhabited with the exception of a Creek settlement on the Hiawasse River. Ramsey, upon what authority is not known, says this was a Uchee settlement.

It is apparent that all these traditions, except that relating to a clan from the neighborhood of Charleston, point to some northern locality as the former home of the tribe, and that in this respect they correspond with the linguistic indications. But these do not exhaust the evidence bearing on this question, as there is a tradition of another nation, and in this case one of the best known and most reliable of all Indian traditions, which agrees with the others in this respect. This is the Delaware legend regarding their ancestral home and migrations. The earliest writer who gives a detailed statement of it is the Rev. Charles Beatty, who visited the Delaware settlements in Ohio in 1767. According to this authority, "of old time their people were divided by a river, nine parts of ten passing over the river and one part remaining behind; that they knew not, for certainty, how they came to this continent; but account thus for their first coming into these parts where they are now settled; that a king of their nation, where they formerly lived, far to the west, left his kingdom to his two sons; that the one son making war upon the other, the latter thereupon determined to depart and seek some new habitation; that accordingly he sat out accompanied by a number of his people and that, after wandering to and fro for the space of forty years, they at length came to Delaware River where they settled three hundred and seventy years ago. The way they keep an account of this is by putting a black bead of wampum every year on a belt they keep for that purpose."

The reason for mentioning this brief notice of the tradition, rather than relying entirely on the fuller account given below, is that it mentions a date purporting to be derived from the Indians.

The tradition as given by Heckwelder, who heard it from the Delawares themselves, and had the advantage of their interpretation and comments, is as follows:—

"The Lenni Lenape (according to the tradition handed down to them by their ancestors) resided many hundred years ago in a very distant country in the western part of the American continent. For some reason which I do not find accounted for, they determined on migrating to the eastward, and accordingly set out together in a body. After a very long journey and many nights' encampment by the way, they at length arrived on the *Namaesi-Sipu*, where they fell in with the Mengwe, who had likewise emigrated from a distant country and had struck upon this riversome-what higher up. Their object was the same with that of the Delawares: they were proceeding on to the eastward until they should find a country that pleased them. The spies which the Lenape had sent forward for the purpose of reconnoitring, had, long before their arrival, discovered that the country east of the Mississippi was inhabited by a very powerful nation, who had many large towns built on the great rivers flowing through their land. Those people (as I was told) called themselves *Talligew* or *Tallegewi*. . . . Many wonderful things are told of this famous people. They are said to have been remarkably tall and stout; and there is a tradition that there were giants among them, people of a much larger size than the tallest of the Lenape. It is related that they had built to themselves regular fortifications or intrenchments, from whence they would sally out, but were generally repulsed. I have seen many of the fortifications said to have been built by them, two of which in par-

ticular were remarkable. One of them was near the mouth of the River Huron, which empties itself into the Lake St. Clair on the north side of that lake, at the distance of about twenty miles north-east of Detroit. This spot of ground was, in the year 1776, owned and occupied by a Mr. Tucker. The other works, properly intrenchments, being walls or banks of earth regularly thrown up, with a deep ditch on the outside, were on the Huron River, east of the Sandusky, about six or eight miles from Lake Erie. Outside of the gateway of each of these two intrenchments, which lay within a mile of each other, were a number of large flat mounds, in which, the Indian pilot said, were buried hundreds of the slain Tallegewi whom I shall hereafter, with Col. Gibson, call Allegewi. Of these intrenchments, Mr. Abraham Steiner, who was with me at the time when I saw them, gave a very accurate description, which was published at Philadelphia in 1789 or 1790, in some periodical work the name of which I cannot at present remember.

"When the Lenape arrived on the banks of the Mississippi, they sent a message to the Alligewi to request permission to settle themselves in their neighborhood. This was refused them, but they obtained leave to pass through the country and seek a settlement farther to the eastward. They accordingly began to cross the Namaesi-Sipu, when the Allegewi, seeing that their numbers were so very great, and in fact they consisted of many thousands, made a furious attack upon those who had crossed, threatening them all with destruction if they dared to persist in coming over to their side of the river. Fired at the treachery of these people and the great loss of men they had sustained, and, besides, not being prepared for a conflict, the Lenape consulted on what was to be done,—whether to retreat in the best manner they could, or to try their strength and let the enemy see that they were not cowards, but men, and too high-minded to suffer themselves to be driven off before they had made a trial of their strength and were convinced that the enemy was too powerful for them. The Mengwe, who had hitherto been satisfied with being spectators from a distance, offered to join them on condition that after conquering the country they should be entitled to share it with them. Their proposal was accepted, and the resolution was taken by the two nations to conquer or die.

"Having thus united their forces, the Lenape and Mengwe declared war against the Alligewi, and great battles were fought, in which many warriors fell on both sides. The enemy fortified their large towns and erected fortifications, especially on large rivers or near lakes, where they were successfully attacked and sometimes stormed by the allies. An engagement took place in which hundreds fell, who were afterwards buried in holes, or laid together in heaps and covered over with earth. No quarter was given, so that the Allegewi at last, finding that their destruction was inevitable if they persisted in their obstinacy, abandoned the country to the conquerors, and fled down the Mississippi River, from whence they never returned.

"The war which was carried on with this nation lasted many years, during which the Lenape lost a great number of their warriors, while the Mengwe would always hang back in the rear, leaving them to face the enemy. In the end the conquerors divided the country between themselves. The Mengwe made choice of the lands in the vicinity of the

Great Lakes and on their tributary streams, and the Lenape took possession of the country to the south. For a long period of time, some say many hundred years, the two nations resided peacefully in this country, and increased very fast. Some of their most enterprising hunters and warriors crossed the great swamps, and, falling on streams running to the eastward, followed them down to the great bay river (meaning the Susquehanna, which they call the great bay river from where the west branch falls into the main stream), thence into the bay itself, which we call Chesapeake. As they pursued their travels partly by land and partly by water, sometimes near and at other times on the great salt-water lake, as they call the sea, they discovered the great river which we call the Delaware."

If this tradition has any foundation in fact (and it certainly seems to have), there must have been a people to whom the name "Tallegwi" was applied, for on this a large portion of it hangs. Who were they? Is it possible to trace them to any tribe of modern times? The supposition of Col. Gibson mentioned by Heckwelder, that the name survives in "Alleghany," applied to the chief river and mountains of western Pennsylvania, is not generally accepted by linguists of the present day. Heckwelder was of opinion that "Talligewi" was a word foreign to the Algonquin, which was simply adopted by the Delawares. Dr. Brinton says, "It is not necessarily connected with Alleghany, which may be pure Algonquin. He (Heckwelder) says, 'Those people called themselves Talligeu or Talligewi.' The accent as he gives it, 'Talligéwi,' shows that the word is Tallike, with the substantive verb termination, so that Talligewi means 'He is a Tallike' or 'It is of (belongs to) the Tallike'" ("The Lenape and their Legends," p. 320).

Heckwelder's account, no doubt colored to some extent by his own interpretation, varies slightly from the tradition as given in the "Walam Olum." He interprets *Namaesi-Sipu* by "Mississippi" because of his opinion that the migration was from the west. It is more probable that Mr. Hale is correct in assuming that it was some portion of the great river of the north (the St. Lawrence) which connects together and forms the outlet for the Great Lakes, possibly that portion which connects Lake Huron with Lake Erie. If this supposition be accepted, it would lead to the inference that the Talamatan—the people who joined the Delawares in their war with the Tallegwi—were Hurons or Huron-Iroquois previous to separation. Mr. Hale's views on this question are expressed in the *American Antiquarian*, April, 1883, as follows:—

"The country from which the Lenape migrated was Shinake, the 'land of fir-trees;' not in the west, but in the far north,—evidently the woody region north of Lake Superior. The people who joined them in the war against the Allighewi (or Tallegwi, as they are called in this record) were the Talamatan, a name meaning 'not of themselves,' whom Mr. Squier identifies with the Hurons, and no doubt correctly, if we understand by this name the Huron-Iroquois people as they existed before their separation. The river which they crossed was the Messeeispe, the 'Great River' beyond which the Tallegwi were found 'possessing the east.' That this river is not the Mississippi is evident from the fact that the works of the mound-builders extended far to the westward of the latter river, and would have been

encountered by the invading nations if they had approached it from the west long before they had arrived at its banks. The great river was apparently the Upper St. Lawrence, and most probably that portion of it which flows from Lake Huron to Lake Erie, and which is commonly known as the Detroit River. Near this river—according to Heckwelder, at a point west of Lake St. Clair, and also at another place just south of Lake Erie—some desperate conflict took place. Hundreds of slain Tallegwi, as he was told, were buried under mounds in that vicinity. This precisely accords with Cusick's statement that 'the people of the great Southern Empire had already penetrated to Lake Erie' at the time the war began. Of course, in coming to the Detroit River from the region north of Lake Superior, the Algonquins would be advancing from the west to the east. . . . The passage already quoted from Cusick's narrative informs us that the contest lasted perhaps one hundred years. In close agreement with this statement, the Delaware record makes it endure during the term of four head chiefs, who in succession presided in the Lenape councils.

The passages of the Delaware record which refer to the Tallegwi, as translated by Dr. Brinton, are as follows:—

"They (the Lenape) separated at Fish River (Nemassipi, sometimes written Mistissippi); the lazy ones remained there. Cabin-man was chief; the Tallegwi possessed the east. Strong-Friend was chief; he desired the eastern land. Some passed on east; the Talega ruler killed some of them. All say in unison, 'War, war!' The Talamatin, friends from the north, come and all go together. The Sharp-one was chief; he was the pipe-bearer beyond the river. They rejoiced greatly that they should fight and slay the Talega towns. The Stirrer was chief; the Talega towns were too strong. The Fire-builder was chief; they all gave to him many towns. The Breaker-in-pieces was chief; all the Talega go south. He-has-pleasure was chief; all the people rejoice. They stay south of the lakes; the Talamatin friends north of the lakes."

Further on, and referring to a later period, are the following verses:—

- "14. The Rich-Down-River-Man was chief, at Talega River.  
18. Snow-hunter was chief; he went to the north land.  
19. Look-about was chief; he went to the Talega mountains.  
20. East-Villager was chief; he was east of Talega.  
40. At this time whites came on the eastern sea.  
42. Well-Praised was chief; he fought at the south.  
43. He fought in the land of the Talega and Koweta.  
45. White-Horn was chief; he went to the Talega,  
46. To the Hilini, to the Shawnees, to the Kanawhas."

The reasons for identifying the Tallegwi or Talega of this tradition with the Cherokees, which will be more fully referred to hereafter, are briefly as follows: 1st, The very close agreement in sound between *Tsalake*, the name the Cherokees gave themselves, and *Tallegwi* or *Talega* as given in the tradition; 2d, The fact that the traditions of the Cherokees refer to the region of the Upper Ohio as their former home; 3d, The statement of Bishop Ettwein that the last of the Cherokees were driven from the Upper Ohio about the year 1700 (see Brinton's "Lenape and their Legends," p. 18); 4th, The testimony of the mounds; and,

5th, The apparent identification of the two peoples in the Walam Olum itself in verses 42 and 43, Part V., where it states that

"Well-Praised was chief; he fought at the south.  
He fought in the land of the Talega and Koweta."

As this part of the record refers to a much later period than that heretofore quoted, a date subsequent to the appearance of the whites on the continent (verse 40, Part V.), there can be no doubt that it alludes to the Tallegwi in their southern home, to which, as stated in verse 59, Part IV., they had been driven. This supposition is apparently confirmed by the fact that it connects with them the Koweta, or Creeks. This, together with the statement that the fighting was at the south, would seem to imply that they were then in their mountain home or historic seat. It is probable, as will be shown hereafter, that where it is stated, in verses 19 and 20, that

"Look-About was chief; he went to the Talega mountains;  
East-Villager was chief; he was east of Talega,"

their position in the Kanawha valley is referred to, where the evidence indicates that they halted for some time on their way south.

CYRUS THOMAS.

#### KILIMA-NJARO.

DR. HANS MEYER, at a meeting of the Royal Geographical Society, London, on April 12, read a paper on his journey to the summit of Kilima-Njaro. As reported in *Nature*, after giving a short account of his expedition in 1887, and the discouragements to which he had been subjected on two subsequent efforts to carry out his programme, Dr. Meyer went on to say, that, while the main portion of the caravan encamped in Marangu, he ascended with Herr Purtscheller and eight picked men through the primeval forest to a stream beyond, where he had encamped in the year 1887, at an altitude of 9,200 feet. There their large tent was pitched, straw huts were built for the men, and firewood collected. Accompanied by four men, they travelled for two more days up the broad, grassy, southern slopes of Kilima-Njaro to the fields of rapilli on the plateau between Kibo and Mawenzi, and found there to the south-east of Kibo, under the protection afforded by some blocks of lava, a spot, at an altitude of 14,270 feet, well suited for the erection of their small tent. As soon as the instruments and apparatus had been placed under cover, three of the men returned to the camp on the edge of the forest; and only one, a Pangani negro, Mwini Amani by name, remained to share uncomplainingly their sixteen-days' sojourn on the cold and barren heights. With regard to their maintenance, it had been arranged that every third day four men should come up with provisions from the lower camp in Marangu to the central station on the edge of the forest, and that two of the men stationed there should thence convey the necessary food to them in the upper camp, returning immediately afterwards to their respective starting-places; and this, accordingly, was done. Firewood was supplied by the roots of the low bushes still growing there in a few localities, and their negro fetched a daily supply of water from a spring rising below the camp. In that manner they were enabled, as if from an Alpine Club hut, to carry out a settled programme in the ascent and surveying of the upper heights of Kilima-Njaro. The ice-crowned Kibo towered up steeply another 5,000 feet to the west of their camp, itself at an altitude of 14,300 feet. On Oct. 3 they undertook their first ascent. The previous day they had resolved to make the first attempt, not in the direction chosen by him in 1887, but up a large rib of lava which jutted out to the south-east, and formed the southern boundary of the deepest of the eroded ravines on that side of the mountain.

Their plan of operations, which they succeeded in carrying

out, was to climb this lava-ridge to the snow-line, to begin from its uppermost tongue the scramble over the mantle of ice, and endeavor to reach by the shortest way the peak to the south of the mountain, which appeared to be the highest point. It was not till half-past seven o'clock that they reached the crown of that rib of lava which had been their goal from the very first, and, panting for breath, they began to pick their way over the boulders and *débris* covering the steep incline of the ridge. Every ten minutes they had to pause for a few moments to give their lungs and beating hearts a short breathing space; for they had now for some time been above the height of Mont Blanc, and the increasing rarefaction of the atmosphere was making itself gradually felt. At an altitude of 17,220 feet they rested for half an hour. Apparently they had attained an elevation superior to the highest point of Mawenzi, which the rays of the morning sun were painting a ruddy brown. Below them, like so many mole-heaps, lay the hillocks rising from the middle of the saddle. A few roseate cumulus-clouds floated far over the plain, reflecting the reddish-brown laterite soil of the steppe; the lowlands, however, were but dimly visible through the haze of rising vapor. The ice-cap of Kibo was gleaming above their heads, appearing to be almost within reach. Shortly before ten o'clock they stood at its base, at an elevation of 18,270 feet above sea-level. At that point the face of the ice did not ascend, but almost immediately afterwards it rose at an angle of thirty-five degrees; so that, without ice-axes, it would have been absolutely impracticable.

The work of cutting steps in the ice began about half-past ten. Slowly they progressed by the aid of the alpine rope, the brittle and slippery ice necessitating every precaution. They made their way across the crevices of one of the glaciers that projected downwards into the valley which they had traversed in the early morning, and took a rest under the shadow of an extremely steep protuberance of the ice-wall at an altitude of 19,000 feet. On recommencing the ascent, the difficulty of breathing became so pronounced that every fifty paces they had to halt for a few seconds, bending their bodies forward, and gasping for breath. The oxygen of the air amounted there, at an elevation of 19,000 feet, to only 40 per cent, and the humidity to 15 per cent, of what it was at sea-level. No wonder that their lungs had such hard work to do. The surface of the ice became increasingly corroded. More and more it took the form which Güssfeldt, speaking of Aconcagua in Chili, called *nieve penitente*. Honeycombed to a depth of over six feet in the form of rills, teeth, fissures, and pinnacles, the ice-field presented the foot of the mountaineer with difficulties akin to that of a "Karrenfeld." They frequently broke through as far as their breasts, causing their strength to diminish with alarming rapidity. And still the highest ridge of ice appeared to be as distant as ever. At last, about two o'clock, after eleven hours' climb, they drew near the summit of the ridge. A few more hasty steps in the most eager anticipation, and then the secret of Kibo lay unveiled before them. Taking in the whole of Upper Kibo, the precipitous walls of a gigantic crater yawned beneath them. The first glance told that the most lofty elevation of Kibo lay to their left, on the southern brim of the crater, and consisted of three pinnacles of rock rising a few feet above the southern slopes of the mantle of ice.

They first reached the summit on Oct. 6, after passing the night below the limits of the ice, in a spot sheltered by overhanging rocks, at an altitude of 15,160 feet,—an elevation corresponding to that of the summit of Monte Rosa. Wrapped up in their skin bags, they sustained with tolerable comfort even the minimum temperature of 12° F., experienced during the night, and were enabled, about three o'clock on the morning of Oct. 6, to start with fresh energy on their difficult enterprise of climbing the summit; and this time Njaro, the spirit of the ice-crowned mountain, was gracious to them: they reached their goal. At a quarter to nine they were already standing on the upper edge of the crater, at the spot from which they had retraced their steps on Oct. 3. Their further progress from this point to the southern brim of the crater, although not easy, did not present any extraordinary difficulty. An hour and a



half's further ascent brought them to the foot of the three highest pinnacles, which they calmly and systematically climbed one after another. Although the state of the atmosphere and the physical strain of exertion remained the same as on the previous ascent, yet this time they felt far less exhausted because their condition morally was so much more favorable. The central pinnacle reached a height of about 19,700 feet, overtopping the others by 50 to 60 feet. Dr. Meyer was the first to tread, at half-past ten in the morning, the culminating peak. He planted a small German flag, which he had brought with him in his knapsack, upon the rugged lava summit, and christened that—the loftiest spot in Africa—"Kaiser Wilhelm's Peak." After having completed the necessary measurements, the travellers were free to devote their attention to the crater of Kibo, of which an especially fine view was obtainable from Kaiser Wilhelm's Peak. The diameter of the crater measured about 6,500 feet, and it sank down some 600 feet in depth. In the southern portion the walls of lava were either of an ash-gray or reddish-brown color, and were entirely free from ice, descending almost perpendicularly to the base of the crater; and in its northern half, the ice sloped downwards from the upper brim of the crater in terraces, forming blue and white galleries of varying steepness. A rounded cone of eruption, composed of brown ashes and lava, rose in the northern portion of the crater to a height of about 500 feet, which was partly covered by the more than usually thick sheet of ice extending from the northern brim of the crater. The large crater opened westwards in a wide cleft, through which the melting water ran off, and the ice lying upon the western part of the crater and the inner walls issued in the form of a glacier. What a wonderful contrast between this icy stream and the former fiery incandescence of its bed! And above all this there reigned the absolute silence of inanimate nature, forming in its majestic simplicity a scene of the most impressive grandeur. An indelible impression was created in the mind of the traveller to whom it had once been granted to gaze upon a scene like that, and all the more when no human eye had previously beheld it. And certainly, as they sat that evening in their little tent, which they finally reached at nightfall, after a most arduous return march through the driving mist, and carried their thoughts back to the expeditions of 1887 and 1888, they would indeed have changed places with no one. After giving further details of the expedition, Dr. Meyer said that on Oct. 30 they sorrowfully bade farewell to Kilima-Njaro, the most beautiful and interesting, as well as the grandest, region in the Dark Continent.

#### NOTES AND NEWS.

THERE are said to be at least a hundred thousand acres of phosphate rock scattered through the western part of the State of Florida. The deposits average ten feet in depth, and are rich in phosphate of lime.

— The new government dry-dock at the Brooklyn Navy Yard, which has been in process of construction a little more than two years, was formally opened on the 10th instant, the double-turret monitor "Puritan" being the first vessel docked. The dock is 530 feet long, with an extreme width of 130 feet 4 inches, and a depth of 32 feet 8 inches. The depth of water over the gate-sill at the entrance is 25 feet 6 inches at high water. The pumps have a capacity of 80,000 gallons per minute, and can empty the dock, when no vessel is in it, in an hour and a half.

— Summer courses for 1890 at Harvard University in the following-named subjects will be given: four courses in chemistry (viz., general elementary chemistry, qualitative analysis, quantitative analysis, and organic chemistry), a course in botany, two courses in physics (viz., elementary physics and a higher course in experimental physics), two courses in geology (viz., an elementary course given in Cambridge, and an advanced course given in the field in New York, Connecticut, and Massachusetts), three courses in French, two courses in German, two courses in field engineering (viz., topographical and railroad surveying), a course in physical training, courses in the Medical School. These courses are

chiefly clinical, and are designed for graduates and advanced students. For information concerning all courses, except those in the Medical School, address the secretary of Harvard University, Cambridge, Mass. For information concerning the courses in the Medical School, address the secretary of the Harvard Medical School, Boston, Mass.

— The "Princess Louise," which arrived at Victoria, B.C., from Skidegate and way ports, on the evening of April 24, brought news that on Feb. 24 an earthquake shock was felt on all the islands around Skidegate, especially on the west coast of Queen Charlotte Islands, where a few old shanties were levelled to the ground. The totem-poles of the Indians shook like leaves, and in some places the earth was cracked. The shock lasted for about thirty seconds, during which time the Indians were wild with fright. A number of them ran to the church and crowded in. Since that time there have been about twenty different shocks, the last one being on the 12th of April, although none were near as severe as the first. A very slight shock was felt in the Skeena.

— State Geologist Winslow of Missouri made a report, May 6, to Gov. Francis, of the operations of his bureau during the month of April. During the month the work of the survey progressed most favorably, not having been interrupted by the variable conditions of weather which caused serious hinderance during the month of March. Excellent progress has been made in the detailed mapping of the coal fields, so that now an area of over two hundred square miles has been covered, and is ready to be plotted on the final sheet. Field-work in connection with the investigation of the zinc and lead deposits was suspended early in April, and since that time Mr. Jenny and his assistant have been busy preparing a report of their operations and results, which will be published in a forthcoming bulletin. Early in April the investigation of the clay deposits in the vicinity of St. Louis was begun, and a reconnaissance of the area including these deposits is completed, and some samples are collected. Work in Iron and other south-eastern counties was interrupted in the early part of the month, but since then has been prosecuted continuously, and much has been accomplished in the systematic mapping of this section of the State. The examination of the mineral waters of the State has also made considerable advance. Springs have been visited in Henry, St. Clair, Benton, and Johnson Counties, and samples of water for analysis have been collected from a dozen different localities. During the month, Bulletin No. 1, the first publication of the survey, has been prepared, published, and distributed, nearly fifteen hundred copies having been sent out to people in the State and elsewhere. Cases for the State cabinet have been put up in one of the rooms of the survey, and are now nearly in a condition to receive specimens. The collections of the survey already include over eight hundred specimens. Some of these have been prepared, and will be labelled for exhibit in these cases.

— Mrs. Isabel Mallon has been added to the editorial staff of *The Ladies' Home Journal* of Philadelphia. Her new position makes her the best-paid fashion-writer in the country.

— Three cash prizes, of fifty, thirty, and twenty dollars respectively, are offered by *Public Opinion*, the eclectic weekly magazine of Washington, D.C., for the three best essays, not exceeding two thousand words, on the subject "The Study of Current Topics as a Feature of School, Academic, and College Education." The papers must reach *Public Opinion* prior to June 15, and the award will be made by a committee of three well-known educators, to be selected and announced before the close of the competition. The prize essays will be published over the signatures of the writers July 5. Particulars of the contest may be had by addressing the editor of *Public Opinion*.

— Bulletin No. 1 of the Missouri Geological Survey, just issued, contains a report of the State geologist, Arthur Winslow, and an article by him on "The Coal-Beds of Lafayette County," "The Building Stones and Clays of Iron, St. François, and Madison Counties," by G. E. Ladd; "The Mineral Waters of Saline County," by A. E. Woodward; and "A Preliminary Catalogue of the Fossils occurring in Missouri," by G. Hambach. This bulletin is the first of a series to be issued at intervals.

## SCIENCE:

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Attention is called to the "Wants" column. All are invited to use it in soliciting information or seeking new positions. The name and address of applicants should be given in full, so that answers will go direct to them. The "Exchange" column is likewise open.

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## MENTAL SCIENCE.

Motor Expression of Ideas.<sup>1</sup>

A GREAT deal of study has lately been given to the phenomena of automatism in their various and perplexing forms. There has been accumulated a large number of the extreme cases in which persons write down quite elaborate sentences and are unconscious of doing so, and the view has been advanced that we have here the minute beginnings out of which develop these peculiar cases of the separation of personality into two or more *egos*. It is, however, the study of the more normal cases, in which the psychological factors are more easily analyzed, that seems to be promising of interesting and practical results. The typical experiment consists in fixing the attention of the subject in one direction, placing in his hand a pencil, and observing what will result if the hand holding the pencil be tempted to move. With some subjects there results a very clearly written word or words reflecting what was uppermost in their thoughts. The subject is often as surprised as any one, having no consciousness of what he had done. M. Gley, who has tried the experiment with a number of persons, offers the suggestion that this motor automatism may be a part of a general mental tendency. It is well known that some persons do their mental representation by visual pictures, others mainly by sounds, and a third variety by motor images. The last class would be represented by those who gesticulate as they speak, who think aloud as it were, who talk to themselves, and, in short, to

<sup>1</sup> Bulletin de la Société de Psychologie Physiologique, 1889.

whom thinking is action. It is likely that with such persons thought expresses itself in action more easily than in others, and hence this automatic writing becomes related to a better understood class of phenomena. The suggestion is capable of an experimental verification, and well deserves it.

A New Use of Auto-Suggestion.<sup>1</sup>

The acting-out of a suggestion imposed upon an hypnotic subject by the hypnotizer has been compared to the self-imposing of a task or a vow. In both cases there is more or less possibility of the suggestion failing to be enacted, depending largely on the opposition to the normal habits and powers of the individual that the suggestion arouses. This power is very different in different persons, and we have a good illustration of it in the relative difficulty different persons have of suggesting themselves to sleep at night. It is similarly possible to train a good hypnotic subject to put himself to sleep either by imagining that the operator were doing it or by observing a certain ceremony, and so on. A large part of the wonderful cures so constantly brought before the public may be viewed as instances of auto-suggestion. Dr. Burot has shown that this power may be utilized in cases of crime hypnotically suggested. A patient wishing to be hypnotized oftener than he could be attended to, was taught to hypnotize himself, and with good success. The suggestion was given to him to commit a theft, which he promptly did. Upon awakening, he forgot all about it, and it was impossible to get him to acknowledge the deed. He was then told to hypnotize himself for the purpose of recalling the circumstances of the case. He awoke, and voluntarily told the whole story just as it happened. The same experiment was successfully made upon other subjects; and the conclusion drawn by Dr. Burot is, that auto-suggestion offers a safe and useful method of discovering the hypnotic origin of a crime.

An Interesting Case of Brain Localization.<sup>1</sup>

There is in Paris a mutual autopsy society, each member of which pledges his body to be dissected after his death by the rest. Special attention is given to the brain, and the society is composed of well known scientists. In this way M. Manouvrier made a careful study of the brain of M. Adolphe Bertillon, and in a supplementary note calls attention to a few peculiarities of special interest. It appears that M. Bertillon was deaf in the left ear, and had been so from infancy. The sense of hearing having been localized in the first temporal convolution, this part of the brain on both sides was examined to see whether there was any difference in the development of the two halves of the brain. It was found that while on the left side this convolution was well developed, with a number of slight ridges and furrows in it, on the right side it was smaller and without these characteristics (the centre for each ear is located in the opposite hemisphere of the brain). While, of course, a single observation of this kind is far from conclusive, yet the method is one promising to corroborate generalizations otherwise reached, and to suggest and explain peculiarities based upon the individual capabilities.

## Visualized Sounds.

A correspondent of *Nature* sends an interesting account of association of visual images with the sounds of musical instruments. "The sound of an oboe brings before me a white pyramid or obelisk, running into a sharp point; the point becoming more acute if the note is acute, blunter if it is grave. The obelisk appears to be sharply defined and solid if the note is loud, and vague and vaporous if it is faint. All the notes of the 'cello, the high notes of the bassoon, trumpet, and trombone, and the low notes of the clarinet and viola, make me see a flat undulating ribbon of strong white fibres. The tone of the horn brings before me a succession of white circles of regularly gradated sizes, overlapping one another. These circles and the ribbon float past me horizontally, but the point of the obelisk seems to come to me." The writer adds, that, though she has been accustomed to hearing music all her life, these effects have been noticed only for five years, in which time they have become more frequent and clearer. If she is familiar with the score of a piece, these visualizations seem to slightly precede the actual sounds. The images are distinctly



seen floating about half way between the seer and the orchestra. While the explanation of these peculiar associations is as yet very defective, the possibility of their anticipating the sounds and their comparatively recent growth, are interesting features of his case, from which a possible explanation might proceed.

#### Physical and Mental Powers.

A number of physical measurements have been made upon 2,134 Cambridge students within the past few years, and Dr. Venn has tabulated these for the purpose of comparing mental with physical faculty. The measurements taken were the distance at which "diamond" type could be read; the maximum pull exerted, as in the act of stretching a bow; the maximum squeeze of each hand; the head volume, which is the product of the extreme length, by the extreme breadth, by the height above a given plane; the lung capacity; and the height and weight. The men were further classified according to scholarship in three grades, *A*, *B*, and *C*, and the averages of all the measurements were separately tabulated for the three grades. As comparatively large and homogeneous groups are dealt with, any correlation of superior physical with superior mental capacity should be evident. The tables, however, show that there is no practical difference in any of the physical averages between the three grades, except in one respect, the strength of pull. Here the lowest grade has the largest average, while the highest grade has the lowest. Dr. Venn interprets this to mean that each grade of students has about the same general physical development, but that strength of pull is something that results from special devotion to athletic sports, and that it is the men who do not devote themselves so assiduously to scholarship who have most time and inclination to develop this side of their physical culture. One other distinction is also noteworthy: it is that the head volume of the first grade in scholarship is greater than in the lowest grade. The difference amounts to about one seventh of the size of the head. How important this fact may be must be determined by future statistics. When tabulated according to age (nine-tenths of the men are between nineteen and twenty-four years of age), it seems clear that the heads of university students keep on growing at least until the age of twenty-four, while in the population generally the growth stops at nineteen years. The height of the physical powers seems to be attained at the twenty-second or the twenty-third year. While these results are in agreement with the modern theory of the relation of mind and body, they show the necessity of distinctive measurements and careful interpretation, if sure results are to be obtained.

#### HEALTH MATTERS.

##### Nose-Bleed.

OBSTINATE nose-bleeding is frequently one of the most difficult things to check. Several aggravated cases have lately occurred at the Hospital of the University of Pennsylvania. As a last resort, Dr. D. Hayes Agnew tried ham-fat with great success. Two large cylinders of bacon were forced well into the nostrils, and the hemorrhage ceased at once. This is a very simple remedy, and one which should be remembered for cases of emergency in the country.

##### Ground-Water and Typhus.

It is well known that a connection has been observed (in Munich and other towns) between ground-water and typhus; the disease gaining force as the water goes down, and declining as the water rises. It is thought that certain decompositions are favored by air taking the place of water in the ground. While in former years Hamburg has exemplified this effect, says *Nature*, the last typhus epidemic there, according to Professor Brückner, was quite in discordance with the variations of ground-water. From 1838, it is stated, the typhus mortality in Hamburg steadily fell from 19 to 2 or 3 per 1000; but from 1885 it rose again to 9; and whereas before 1885 the epidemic was a summer one, with its maximum in August, it now became a winter one, with maximum in December. The curve of ground-water continued to have the same course as before. Professor Brückner points out that this epidemic of 1884-87 corresponded in time with certain harbor

works being carried out at Hamburg; and he attributes it to the upturning of enormous masses of earth, the abode of numberless bacteria, whose diffusion among the inhabitants was thus facilitated.

#### The Physiology of Taste.

The localization of the different forms of taste sensations is a subject which is usually cursorily passed over in text-books, with the statements that the posterior third, the tip, and sides of the tongue only are sensitive; that sweet substances are best perceived by the tip, bitter ones at the back; and so on. In a German medical journal is an abstract of interesting observations by Oehrwald, who, by the aid of a lens, stimulated the individual papillæ by means of a fine brush dipped in solutions of sugar, quinine, acetic acid, and salt. He found that, as had before been observed, the circumvallate papillæ were particularly sensitive, but that on the sides and tip the fungiform papillæ only were sensitive. He estimated that in the whole tongue there were 350 to 400 of these papillæ, of which he found 125 only to respond to stimuli. Many of them appeared to be excited by all four of the substances employed, but in other cases papillæ were found to respond to one form of stimulus but not to another. Thus nineteen per cent responded to acetic acid, but not to sugar; twenty-four per cent which were sensitive to acid were unaffected by quinine; while fifteen per cent which recognized sugar did not respond at all to the application of quinine. All of the papillæ were sensitive to touch, pain, heat, and cold. When stimulated by a mild faradic current, an acid taste only was excited. He confirmed the observations of older authors, that most of the anterior two-thirds of the dorsum of the tongue was devoid of gustatory papillæ.

#### The Pre-Frontal Region of the Brain.

Modern physiologists, says a Berlin correspondent of the *Lancet*, regard the pre-frontal part of the brain as the seat of character and intellect. After the removal of this part in dogs and monkeys, no paralysis of any muscles or loss of sensibility occurs, but singular changes in the behavior, emotions, and character of the animals have been observed. They become livelier, restless, impatient, irritable, quarrelsome, and violent. Their movements seem purposeless, and their attention to what is going on around them, and their intelligence, are diminished. These observations have been confirmed by similar phenomena in the case of human beings. The well-known "Crowbar case," described by the American physician Dr. Harlow, is one in point. A young man was busy tamping a bursting-charge into a rock with a pointed iron rod, when the charge suddenly exploded and the rod entered his head under the angle of the lower jaw, came out in the frontal region, and was found some distance off, covered with blood and brain-substance. He became childish, wilful, fickle, and restless, and suffered loss of intellectual power. Gradually, however, these symptoms disappeared: he recovered, and lived for thirteen years. His skull is preserved in Harvard University.

#### Gastric Juice and Pathogenic Germs.

Drs. Kurlow and Wagner, in a paper on "The Influence of Gastric Juice on Pathogenic Germs," which they publish in the *Vratch*, describes some interesting experiments which they have made on this subject, from which they are led to the conclusion that constant or specific microbes do not exist in the stomach; and those which enter it, together with sputum, food, or other ingesta, are only accidental and temporary residents, and cannot live in the normally acid contents of the stomach. Gastric juice is, according to the authors' experiments, an exceedingly strong germicidal agent, and when living bacilli get into the intestinal canal it is due to various conditions entirely independent of the gastric juice. When the latter is normal and in full activity, only the most prolific microbes, such as tubercle bacilli, the bacilli of anthrax, and perhaps the staphylococci, escape its destructive action; all others are destroyed in less than half an hour. Similar influences exist in the intestines, as proved by inoculations with the cholera bacilli. On the latter subject the authors intend making further experiments.

### Caisson or Tunnel Disease.

As one of the New York members of the board of consultants of St. Francis Hospital, Jersey City, J. Leonard Corning, M.A., M.D., of New York, had the rare opportunity of studying a number of cases of that remarkable affection known as the "caisson" or "tunnel disease," which he reported in the *Medical Record* for May 10, 1890. The disease is an affection of the spinal cord, due to a sudden transition from a relatively high atmospheric pressure to one much lower. Hence, those who work in caissons, or submerged tunnels, under an external pressure of two atmospheres or more, are liable to be attacked by the disease shortly after leaving the tunnel. The seizure never, however, occurs while the subject is in the caisson, or, in other words, while he remains under pressure.

The chief clinical features of the disease are pain, which may be relatively mild, as when confined to some portion of one or more extremities, or of frightful intensity, as when it appears in the ears, knees, back, or abdomen; anæsthesia and paralysis, usually of paraplegic type; bladder symptoms, assuming the form of retention or incontinence; and, more rarely, rectal disturbances (usually incontinence).

In cases of moderate severity the patient usually recovers in a few days or weeks, while in the very severe ones he gradually loses strength, and eventually succumbs. Besides these extreme phases of the disease, there is an intermediate class of cases in which the patient, though grievously ill, may recover sufficiently to get about with sticks, or even unassisted. In these cases recovery is, however, but partial, the subject remaining more or less feeble and hyperæsthetic during the remainder of his life.

Since Triger, a French engineer, first described the characteristic pains of the caisson-disease in 1841, the affection has several times received attention at the hands of European physicians who were in a position to observe it in connection with the diving-bell, bridge-building, mining, and other operations requiring the use of compressed air.

In the United States several opportunities of studying the disease have occurred during the last few years. The most noteworthy of such occasions were the construction of the St. Louis Bridge in 1868, the Brooklyn Bridge at New York about the same time, and the Hudson River Tunnel at a later date.

### The Inefficiency of Sand Filters.

Drs. Frankel and Piefke of Berlin have recently made an exhaustive study on the filtration of drinking-water through sand (*Zeitschrift für Hygiene*, No. 1, 1890). Their experiments conclusively prove, says *Medical News*, that the danger of infection from impure water is only slightly reduced by filtration through sand; bacteria passing through at all times, but in larger numbers just after the filter has been cleaned, and again after it has been in use for some time.

### LETTERS TO THE EDITOR.

\*.\* Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.

The editor will be glad to publish any queries consonant with the character of the journal.

On request, twenty copies of the number containing his communication will be furnished free to any correspondent.

### Census of Hallucinations.

MAY I ask for the publicity of your pages to aid me in procuring co-operation in a scientific investigation for which I am responsible? I refer to the "Census of Hallucinations," which was begun several years ago by the Society for Psychical Research, and of which the International Congress of Experimental Psychology at Paris, last summer, assumed the future responsibility, naming a committee in each country to carry on the work.

The object of the inquiry is twofold: 1st, to get a mass of facts about hallucinations which may serve as a basis for a scientific study of these phenomena; and, 2d, to ascertain approximately the proportion of persons who have had such experiences. Until the average frequency of hallucinations in the community is known, it can never be decided whether the so-called "veridical"

hallucinations (visions or other "warnings" of the death, etc., of people at a distance) which are so frequently reported, are accidental coincidences or something more.

Some eight thousand or more persons in England, France, and the United States, have already returned answers to the question which heads the census-sheets, and which runs as follows:—

"Have you ever, when completely awake, had a vivid impression of seeing or being touched by a living being or inanimate object, or of hearing a voice; which impression, so far as you could discover, was not due to any external physical cause?"

The congress hopes that at its next meeting, in England in 1892, as many as fifty thousand answers may have been collected. It is obvious that for the purely statistical inquiry, the answer "No" is as important as the answer "Yes."

I have been appointed to superintend the census in America, and I most earnestly bespeak the co-operation of any among your readers who may be actively interested in the subject. It is clear that very many volunteer canvassers will be needed to secure success. Each census-blank contains instructions to the collector, and places for twenty-five names; and special blanks for the "Yes" cases are furnished in addition. I shall be most happy to supply these blanks to any one who will be good enough to make application for them.

WM. JAMES.

Harvard University, Cambridge, Mass., May 10.

### The Winnebago County (Iowa) Meteorites.

ON Friday evening, May 2, 1890, at 5.15 P.M., standard western time, a meteor was observed over a good part of the State of Iowa, and is described as a bright ball of fire, moving from west to east, leaving a trail of smoke which was visible for some minutes. It was accompanied by a noise likened to that of heavy cannonading or of thunder; and many people rushed to the doors, thinking it was the rumbling of an earthquake. Substantiated reports have been received from Des Moines, Mason City, Fort Dodge, Emmetsburg, Algonia, Ruthven, Brett, and Forest City. The noise was also heard at Sioux City. Some of these places were at a distance of over a hundred miles from the point where the meteor fell. It exploded about eleven miles north of Forest City, Winnebago County, in the centre of the northern part of Iowa, latitude 43° 15', longitude 93° 45' west of Greenwich, near the Minnesota State line. The fragments were scattered over a considerable surface of ground. Up to the present time, there have been found a 104-pound, a 70-pound, and a 10-pound mass, and a number of fragments weighing from one to twenty ounces each; and a part of the main mass of the meteorite is believed to have passed over into Minnesota. The pieces are all angular, with rounded edges.

This meteorite is a typical chondrite, apparently of the type of the Parnallite group of Meunier, which fell Feb. 28, 1857, at Parnallee, India. The stone is porous, and when it is placed in water to ascertain its specific gravity, there is a considerable ebullition of air. The specific gravity, on a fifteen-gramme piece, was found to be 3.638. The crust is rather thin, opaque black, not shining, and, under the microscope, is very scoriaceous, resembling the Knyahinya (Hungary) and the West Liberty (Iowa) meteoric stones. A broken surface shows the interior color to be gray, spotted with brown, black, and white; the latter showing the existence of small specks of meteoric iron from one-tenth to four-tenths of a millimetre across. Troilite is also present in small rounded masses of about the same size. On one broken surface was a very thin seam of a soft black substance, evidently graphite (?), and soft enough to mark white paper; a felspar (anorthite?) was also observed, and enstatite was also present. I present a paper on this meteorite at the meeting of the New York Academy of Sciences, May 12, and will give full particulars at the next meeting.

This is the fourth meteorite that has been seen to fall in Iowa. The other three falls were as follows: at Hartford, Linn County, Feb. 25, 1847; at West Liberty, Iowa County, Feb. 12, 1875; and the great fall of siderolites at Estherville, Emmet County, May 10, 1879, which fall comprised over two thousand pieces weighing from a tenth of an ounce to four hundred pounds.

GEORGE F. KUNZ.

New York, May 8.

A REMARKABLE meteor, or meteoric shower, passed over this State at 5.30 P.M., Friday, May 2. In spite of the brightness of the sun, shining at the time in a nearly cloudless sky, the light of the meteor was very noticeable. Its great size, powerful illumination, discharge of sparks, comet-like tail three to five degrees in length, and the great train of smoke which marked its course for a full ten minutes after its passage, made a strong and lasting impression on the minds of all who saw it. Unfortunately the clamor over an exciting game of ball prevented the many members of the college who saw it from making as careful observations as they would otherwise have done: so it was impossible to tell whether its passage was accompanied by sound or not, although farmers near here report a faint hissing noise. It appeared to enter the atmosphere about twenty to thirty degrees south of the zenith, and, descending at an angle of about fifty to sixty degrees, passed below the horizon north-north-west of this place. By telegraphing, one small meteorite weighing one-fifth of a pound, and several fragments from a 70-pound one, were secured, and analyses and microscopic sections at once made. They contain a large amount of metal for the "stone" class of meteorites.

Following is the analysis of the matrix of the 70-pound meteorite: silica, 47.03; iron oxide, 29.43; oxide aluminium, 2.94; lime, 17.58; magnesia, 2.96; total, 99.94.

The specific gravity is 2.63. The shower covered an area at least two and a half miles long by one wide, near Forest City, Io. There the meteorites are said to have fallen in great numbers; and already many have been found, varying from a few ounces to sixty or seventy pounds in weight.

It seems worthy of mention, that, in accordance with theories entertained here, a 100-pound aerolite has just been found in Kosuth County, some thirty or forty miles farther north. These meteorites all have the characteristic burned, blackened surfaces. Within they are light gray, interspersed with innumerable irregular spots of iron. The many exaggerated and excited reports make it difficult to get at facts: so it seems best for the present to make only a preliminary statement and analysis, until we can make a full and accurate report on this last and highly interesting Iowa meteor.

JOSEPH TORREY, JR.  
ERWIN H. BARBOUR.

Iowa College, Grinnell, May 9.

#### BOOK-REVIEWS.

*Die Entstehung der Arten durch räumliche Sonderung.* Von MORITZ WAGNER. Basel, 1889. 8°.

MORITZ WAGNER, traveller and journalist, was born Oct. 3, 1813, at Bayreuth, and died at Munich, May 30, 1887, by his own hand. He regarded the principal achievement of his life to have been the enunciation of his theory of the origin of species by geographical separation. He wished, toward the close of his life, to publish a comprehensive work on this theory; but an accident having crippled him, and illness interfering, he never carried out his purpose. His nephew and namesake, Dr. Moritz Wagner, 2d, of Baden by Zurich, has collected most of the elder Moritz' essays in a single bulky volume, to which he has added his own "rider" in the shape of a speculative dissertation on the origin of life and the evolution of species, and prefixed a memoir by Von Scherzer. In judging of Wagner, we have to remember always that journalism was his profession and means of support, and that natural history, though his favorite study, always occupied a second place until the latter part of his life. His father was a school-teacher in poor circumstances, and with six children. Young Moritz showed his master passion by keeping animals and making large collections. When only fifteen years, he contributed editorial articles to some of the local newspapers of Augsburg, where his family were then living. In 1836, when twenty-three years old, he undertook his first journey, going to northern Africa, where he secured an appointment to accompany the French Army in Algiers. The necessary preliminary outlay was covered by advances made by his brothers and friends, and all the expenses were finally met by the sale of his collections and the earnings of

his pen. He sent frequent letters to the *Augsburger Allgemeine Zeitung*, then as now a leading journal. These letters were eminently successful; and from this time on, Wagner undertook one journey after another, earning the means by his writing. After his first journey he felt the lack of scientific training, and accordingly spent two years at Göttingen, studying geology principally, maintaining all the while his newspaper activity. His next enterprise was a journey to the Caucasus, Black Sea, and Persia, and later followed his principal journey. In company with Von Scherzer, he came to New York, May, 1852, travelled over the United States for a year and in Central America for two years, much of the time collecting archæological material for the British Museum. His reputation as a writer and traveller attracted the favor of the King of Bavaria, who gave him liberal aid for another long exploring journey to Central and South America.

Except as regards the Australian and polar regions, Wagner possessed an intimate acquaintance with all the principal faunas and floras of the world, and the central interest of all his work lies in the study of the geographical distribution of species. The phenomenon which attracted his attention most was that of closely allied species occupying separated areas of distribution. Thus among rattlesnakes, all of which are American, *Crotalus durissus* belongs to the Atlantic fauna; *C. rhombifer*, to Central America; *C. miliarius*, to the south-western United States; *C. tergeminus*, to the Rocky Mountains; *C. horridus*, to Brazil; and so on. Similar instances recur in all classes of plants and animals. The most striking examples are furnished by the humming-birds, some of which are widely distributed, like our own *Trochilus colubris*, which ranges from Mexico to Labrador, while others are exceedingly restricted, there being a number of species which are limited not merely to a single mountain, but also to certain altitudes. There is, says Gould, a new species about every thousand feet. The genus *Orestrochilus* occurs only at great heights, 10,000 feet and more, and is represented by distinct species on Aconcagua, Cotopaxi, Chimborazo, Cayambe, and other mountains. *Orestrochilus chimborazo* lives up to 16,000 feet, and hunts for flies above the snow limit. Wagner's writings give these examples and many others. This class of facts acquired an immense importance in his mind, and led him to think that species always are distinguished by separate areas of distribution; and as a corollary from this opinion he maintained that species arise by a common stock, having two or more areas of distribution, which become distinct or separated by some physical barrier, and that the separation causes the differentiation of the original single species into a corresponding number of new species.

The first formal announcement of his theory was made by Wagner in a brochure published at Leipzig in 1868, and entitled "Die Darwin'sche Theorie und das Migrationsgesetz der Organismen." He defended the theory in 1870 in a pamphlet on the influence of geographical isolation, and also in three articles published in the periodical *Kosmos* for 1880. All of these, and others bearing upon the subject, are included in the volume before us. Wagner's essays show the journalist. They are all discursive and pleasant, it is easy to read along in them, but there is a complete absence of that formidable marshalling of facts and unconquerable logic which is the stamp of Darwin's work. Wagner nowhere compiles all the facts of geographical isolation, nor enumerates those which conflict with his theory, either to acknowledge their force or explain them away. He leaves us, moreover, completely in the dark as to how geographical isolation causes new species. All that he has done is to make the generalization that in a large class of cases closely allied species have distinct areas of distribution, — a fact which indicates that separation is a favorable condition for the development of species, but does not prove it to be a cause. Moreover, the fact that often closely allied species have similar or even identical areas of distribution shows that species arise from other influences than mere separation. Nor can Wagner's theory explain the phenomena of mimicry. These objections have all been urged against Wagner's theory of the origin of species,<sup>1</sup> and their force has justly prevented the general acceptance of the theory: at the same time naturalists have recognized the value of the array of facts presented by Wagner.

<sup>1</sup> See especially August Weismann's criticisms, published in 1872.

The appendix by the nephew, the younger Moritz, is one of those odd pieces of speculative effort to solve the most abstruse problems of science which are only possible when the range of knowledge is very limited in the speculator's mind. He puts forward the hypothesis that life arose while the earth was a core of liquid fire surrounded by gases; an electric spark caused an explosion in the gaseous envelope, which produced organic compounds; the compound at once existed in the form of separate living particles; the circulation in the atmosphere caused the particles to enter into vortices, and when the centrifugal motion predominated pseudopodia were thrown out, when the centripetal force got the control a nucleus was generated; and there have been nuclei ever since. It will be remembered that when the bean split itself with laughing, it was sewed up by the tailor, and all beans have had black seams ever since; but who can tell us how the nucleus and the bean got hold of such enduring heredity of acquired characteristics? In the following chapters of the appendix there is more regard paid to the conceivable: yet throughout, the editor is seen not to be grown to his work; for example, in discussing the planorbis shells at Steinheim, he makes no mention of Professor Hyatt's work.

The editor has fulfilled a graceful and acceptable labor in gathering together his uncle's papers, and we hope that as now collected they may secure renewed attention, not to Moritz Wagner's migration theory, but to the peculiar facts of geographical distribution which led to the theory, and have an important bearing on the problem of natural selection. CHARLES S. MINOT.

*Electric Transmission of Energy, and its Transformation, Sub-division, and Distribution.* By GISEBERT KAPP. New York, Van Nostrand. 12°. \$3.

THIS is the second edition of a work which first appeared some three or four years ago, a notice of it being printed in these columns at the time. It belongs to the well-known "Specialists' Series," intended mainly for the use of students and electrical engineers; though to all persons interested in the special field it occupies it will prove useful and valuable, especially so to students of what may be termed "the comparative anatomy of dynamos and motors."

We are glad to see that the changes necessitated in such a work by the progress of electrical science during the past few years have been made, "bringing the book up to date," as the author says. Among the changes made, it may be mentioned that the author's method for the predetermination of the characteristics of dynamos has been introduced, thereby making the theoretical part of the work more complete. Though this now well-known method had been made use of by Mr. Kapp before the appearance of the first edition of the work, he had not sufficient confidence in its general applicability to give it a place in

the book. Since that time, however, the results of the method, as applied by other electrical engineers, have been so satisfactory that it has been deemed worthy of a place in the volume, and justly so.

In the portion of the volume devoted to practical electricians many noticeable alterations have been made, due mainly to recent progress in the construction of dynamos. Obsolete machines are no longer mentioned, and descriptions of new types, or new modifications of previous types, are introduced, data comprising the leading features of such machines and the results of actual tests being given whenever practicable. This is done because the author believes that precise information regarding a few characteristic features in the design of successful dynamos are of much greater value to the electrician than more extended general descriptions.

The portion of the work devoted to electric railways has received but slight addition, notwithstanding the great progress made in that department during the past few years. The reason for this seeming omission is obvious. To do the subject justice would require a volume larger than that in which a single chapter only can be spared it without infringing on other portions of the field, all of which are equally important in a general survey such as this aims to be.

The transmission of energy by alternating currents is not touched upon, that phase of electrical development being still in the experimental stage (except for lighting); though Mr. Kapp considers it possible, that, "for the transmission of very large powers over very long distances, the alternating current may eventually prove more convenient than the continuous current."

The book is an important one, covering a field through which Progress seems to travel in seven-league boots; and the brief interval between the appearance of the two editions seems to be a very close measure of the time between the experimental stage and the complete commercial success of long-distance transmission of electrical energy.

*The Economic Basis of Protection.* By SIMON N. PATTEN. Philadelphia, Lippincott. 12°. \$1.

THIS book is a plea for the high tariff; but it is one of the least efficient of such pleas that we have met with. It is a mass of confusion, the author often getting bewildered with his own argument,—a fact that will not surprise those who have read his other works. He uses the deductive method exclusively, and is not at all particular about his premises. Indeed, he expressly says that "the theory of a subject must always be developed previous to any intelligent study of the facts" (p. 9); and he has certainly applied this rule faithfully in the present case. We cannot undertake to give an analysis of his arguments here; but one of his chief points is the endeavor to show that free trade fos-

Publications received at Editor's Office,  
April 28-May 10.

- AFRICA. Pictorial. New York and Chicago, Fleming H. Revell. 396 p. \$2.50.  
CARNOT, N.-L.-S. Reflections on the Motive Power of Heat and on Machines fitted to Develop that Power. Ed. by R. H. Thurston. New York, Wiley. 260 p. 12°. \$2.  
CHAMBERS, G. F. A Handbook of Descriptive and Practical Astronomy. II. Instruments and Practical Astronomy. 4th ed. Oxford, Clarendon Pr. 8°. (New York, Macmillan, \$5.25.)  
GEOLOGISK kart over De skandinaviske lande og Finland. Udgivet af Hans Reusch. New York, N. D. C. Hodges, 47 Lafayette Place. 40 cents.  
GREEN, W. S. Among the Selkirk Glaciers. London and New York, Macmillan & Co. 251 p. 12°. \$2.25.  
PATTEN, S. The Economic Basis of Protection. Philadelphia, Lippincott. 144 p. 12°. \$1.  
TUTHILL, Mrs. L. C. The True and the Beautiful in Nature, Art, Morals, and Religion. Selected from the works of John Ruskin, with a notice of the author. 2 vols. New York, Wiley. 638 p. 12°. \$2.  
WHITING, H. A Short Course of Experiments in Physical Measurement. Part I. Density, Heat, Light and Sound. Cambridge, Mass., John Wilson & Son. 278 p. 8°.

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ters what he calls "natural monopolies," or, in other words, that it increases the cost of food and the rent of land. His arguments in support of this position are strangely inconclusive, and the whole theory is upset by the example of the English corn-laws. It was not free trade, but protection, that made food dear in England; and it would have become still dearer if the corn laws had not been repealed. Professor Patten advocates protectionism, not as a temporary expedient, but as "part of a fixed national policy" (p. 8). He maintains that "our economic conditions are so different from those of any foreign nation that an American industrial policy must be of a distinct type from that of other nations" (p. 14); and he thinks it best for us to "isolate ourselves" as much as possible from the nations of Europe. Such are some of the salient points of the work; but we doubt if they will have much influence on public opinion.

#### AMONG THE PUBLISHERS.

A SMALL geological map of the Scandinavian Peninsula, Denmark, Finland, Iceland Greenland, and Spitzbergen, by Dr. Hans Reusch, the director of the Norwegian Geological Survey, has lately been published in Christiania, Norway. Copies of this map will be sent postpaid, on receipt of 40 cents, by N. D. C. Hodges, 47 Lafayette Place, New York.

—John Wiley & Sons announce as in preparation "Elliptic Functions," by Professor Arthur L. Baker of Stevens Institute.

—George Keil, publisher, 1214 Filbert Street, Philadelphia, requests the members of the medical profession in the States of New

York, Ohio, Illinois, Indiana, and Iowa, to forward, at their earliest convenience, the following points: name in full, school of graduation and year, post-office address, and State. This will be used in the pages of the "Medical Register Directory and Intelligencer," Dr. William B. Atkinson, editor. A copy of the book will be forwarded without charge to each physician whose name appears in its pages. The matter in preparation for it is of such value that every one who receives a copy will be sure to keep it at hand for reference. Its list of national and local medical organizations and post-office addresses of physicians will be complete to date of issue, besides other information.

—Messrs. E. & F. N. Spon announce as ready about June 1 "The Disposal of Household Wastes," a discussion of the best methods of treatment of the sewage of isolated country houses, of suburban dwellings, of houses in villages and smaller towns, and of large institutions, and of the modes of removal and disposal of garbage, ashes, and other solid house-refuse, by W. P. Gerhard. They also announce as published, "Tropical Agriculture" (new edition, revised, bringing down the statistical and general information to the present time), a treatise on the culture, preparation, commerce, and consumption of the principal products of the vegetable kingdom, by P. L. Simmonds; "Buchanan's Tables of Squares," containing the square of every foot, inch, and sixteenth of an inch between one-sixteenth of an inch and fifty feet, by E. E. Buchanan; and "Domestic Electricity for Amateurs," an interesting book for the general reader as well as the electrician, translated from the French of E. Hospitalier, with additions, by C. J. Wharton.

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— Macmillan & Co. announce as just ready a folio volume on "Scottish National Memorials," with three hundred illustrations, including thirty full-page plates. The following subjects are treated: Scottish archaeology, historical and personal relics, Scottish literature and literary relics, burghal memorials of Edinburgh and other cities, etc. A series of small books under the general title "Science in Plain Language" is also announced. The first volume, to be published immediately, includes the following subjects: evolution, antiquity of man, bacteria, etc.; the object of the author being to give the general results of scientific investigation in plain, every-day language for the general reader.

— Andrew D. White will take "The Antiquity of Man and Egyptology" as the subject of a chapter in the Warfare of Science Series, to appear in the June *Popular Science Monthly*. His account of how Egyptian chronology was cramped and twisted to make it agree with the belief that the first man was created just 4,004 years before Christ, shows an intellectual servility in the past that can hardly be realized at the present day. The June number will also contain "In the Atelier of a Glass-Worker," by Professor C. H. Henderson (the fourth illustrated article on glass-making), which will tell how the beautiful designs are produced that delight us in engraved, etched, and cut glass; the concluding chapters on "Justice," which are to form a part of Herbert Spencer's system of philosophy, in which the sentiment of justice and the idea of justice are carefully analyzed; and an article describing certain evidences of glacial action in south-eastern Connecticut, by David A. Wells. This account will be illustrated with pictures of some of the great boulders which are thickly strewn over this region.

— John Wiley & Sons, New York, are publishing in a neat and convenient size some of Mr. Ruskin's most popular works. They are printed from new plates on fine paper, and bound in extra cloth, gilt head, and uncut edges. This series will consist of at least twelve volumes, 18mo, price one dollar per volume, and will

be extended to include his complete works. The following volumes are now ready; viz., "Sesame and Lilies," "Ethics of the Dust," "The Crown of Wild Olive," "Queen of the Air." They also announce, uniform with the above in size, style, and price, a second series, selections from the works of John Ruskin, edited by Mrs. Tuthill and others. Of this latter series, "The True and Beautiful in Nature, Art, Morals, and Religion," by Mrs. L. C. Tuthill, is now ready, and it will be followed immediately by "Præterita; or, The Autobiography of John Ruskin" (from new plates, with frontispieces).

— "Hatred of England," the existence of which in the United States he denies, is discussed in *The North American Review* for May by Goldwin Smith. In the same number Sir Richard Cartwright gives an account of "Protection in Canada." Other subjects of timely interest are, "A Few Words on Col. Ingersoll," by Archdeacon Farrar; "Audacity in Woman Novelists," by George Lathrøp Parsons; "Why Cities are Badly Governed," by State Senator Fassett; and "The Typical American," by Andrew Lang and Max O'Rell.

— "A Catalogue of Minerals and Synonyms," by Professor Thomas Egleston, Ph.D., School of Mines, Columbia College, was published in April, 1889, by the National Museum in Washington, and the edition was exhausted within a few months after its publication. There has been so great a demand for the work since the distribution of the first edition, that it is proposed to republish it in an improved form (one column on a page), leaving a large margin for notes and additions, that it may be more serviceable as a catalogue of mineral collections. The catalogue will be carefully revised and brought up to date, and re-issued, provided a sufficient number of subscribers can be obtained to warrant it. It is believed that this will prove to be a most useful book to those making or possessing collections of minerals. The price by subscription will be two dollars, and after publication \$2.50. John Wiley & Sons, New York, are the publishers.

#### CALENDAR OF SOCIETIES.

##### The Anthropological Society, Washington.

May 6. — A. P. Montague, Roman Stationery; J. Owen Dorsey, A Teton's Account of the Sun-Dance; George E. Curtis, Notes on the Amish.

##### Philosophical Society, Washington.

May 10. — J. Elfreth Watkins, Early Diving-Engines, with Special Reference to that constructed by J. Ramsden, in 1775; W. J. McGee, Recent Geographic Changes on the Atlantic and Gulf Coasts.

##### Women's Anthropological Society of America, Washington.

May 10. — Mrs. Laura M. Schofield, Revision of the Presbyterian Creed.

##### Engineers' Club, St. Louis.

May 7. — Arthur T. Woods, Compound Locomotives; Otto Schmitz, Granitoid Curb and Gutter.



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